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Before the
Office of the United States Trade Representative
Trade Policy Staff Committee

CONFIDENTIAL BUSINESS INFORMATION
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POTENTIAL ACTION UNDER SECTION 203 OF THE TRADE ACT OF 1974 WITH REGARD TO IMPORTS OF CERTAIN STEEL	)

REQUEST
OF
GERLIN, INC.
TO EXCLUDE FROM IMPORT RELIEF
STAINLESS STEEL FLANGE FORGINGS
(HTSUS 7303.21.1000)

Simeon M. Kriesberg
Carol J. Bilzi
Lisa L. Levine
MAYER, BROWN & PLATT
1909 K Street, N.W.
Washington, D.C. 20006-1101

Counsel for
Gerlin, Inc.

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EXECUTIVE SUMMARY

This exclusion request is submitted on behalf of Gerlin, Inc. of Carol Stream, Illinois, a U.S. manufacturer of stainless steel flanges and stainless steel butt-weld pipe fittings. While Gerlin supports a remedy with respect to imports of finished stainless steel flanges and butt-weld pipe fittings, it strongly opposes a remedy with respect to imports of stainless steel flange forgings. This submission will address the reasons why stainless steel flange forgings should be excluded from any remedy imposed by the President.[1/]

The domestic stainless steel flange industry includes both integrated producers — those that produce their own flange forgings and manufacture them into finished flanges — and non-integrated producers, such as Gerlin, that have no forging capability. Non-integrated producers must purchase forgings from outside sources. Because stainless steel flange forgings are made in the United States almost exclusively by integrated manufacturers of forgings and flanges, the forgings are not available to independent flange makers such as Gerlin, which compete directly with the integrated producers in the market for finished flanges. Indeed, the ITC staff found that forgings are one of a number of stainless steel products that purchasers identified as "unavailable or in short supply in the U.S. market." Staff Report to the Commission on Inv. No. TA-201-73, at STAINLESS-100 ("Staff Report"). As a result, Gerlin must rely on imported forgings to conduct its business.

[1/] For purposes of its injury analysis, the International Trade Commission (the "ITC") grouped together, in a product category 33 called "stainless steel flanges and fittings," seven tariff classifications, covering finished stainless steel flanges (HTSUS 7303.21.5000), stainless steel flange forgings (HTSUS 7303.21.1000), and five other stainless steel products (butt-weld pipe fittings, pipe couplings, elbow and bends, nipples, and other tube and pipe fittings).

Without a reliable supply of flange forgings, Gerlin would be driven from business regardless of any restraints that the President placed on imports of finished flanges. If the President were to impose restrictions on imports of flange forgings, it would cripple the ability of Gerlin, and other independent flange makers, to undertake adjustments to become more competitive with imports of finished flanges.

I. PRODUCT DESCRIPTION: STAINLESS STEEL FLANGE FORGINGS

Stainless steel flange forgings are classified under HTSUS 7303.21.1000. Flange forgings are rough forms that are hot-forged, usually from billet and sometimes from bar. A forging is an intermediate product used to manufacture a finished flange. *Stainless Steel Flanges From India and Taiwan*, Inv. No. 731-TA-639 and -640, USITC Pub. 2724, at I-7 (Feb. 1994). There is no commercial or end-use market for forgings. Rather, non-integrated producers, such as Gerlin, purchase forgings for the sole purpose of manufacturing them into flanges. *Id*.

Flanges are used to connect stainless steel pipe sections and piping system components at points at which the ability to disconnect and reconnect the sections or components is crucial. Flanges of stainless steel are particularly used when the piping system must be able to withstand corrosion, prevent contamination, withstand extreme temperatures, or contain high pressure.

Forgings must undergo extensive manufacturing processes in order to be transformed into a flange, and under customs law those processes constitute "substantial transformation." *See Midwood Industries, Inc. v. United States*, 313 F. Supp. 951 (Cust. Ct.), *appeal dismissed*, 57 C.C.P.A. 141 (1970). Depending upon the type of finished flange, those manufacturing processes may include: heat treatment, machining, beveling, threading, center-boring, washing, and degreasing. Bolt holes are drilled and counter-sunk on finished flanges. Finished flanges are

manufactured to American Society for Testing and Materials ("ASTM") specifications. To appreciate the extent of manufacturing that transforms a forging into a flange, a typical two-inch threaded or slip-on flange forging begins Gerlin's production process weighing 6.82 pounds; the finished flange weighs 4.8 pounds.

There are no U.S.-produced substitutes for stainless steel flanges, and accordingly there are no substitutes for stainless steel flange forgings. *See Stainless Steel Flanges From India and Taiwan*, Inv. No. 731-TA-639 and -640, USITC Pub. 2724, at II-10 (Feb. 1994) (no practical substitutes for forged stainless steel flanges).

II. PRODUCERS OF STAINLESS STEEL FLANGE FORGINGS

There are several partially or fully integrated U.S. producers of flange forgings and finished flanges: Ideal Forging Company, Maass Flange Corporation, Newman Flange Company, Texas Metals, Inc., Westbrook Manufacturing, and Western Forge and Flange. These producers make flange forgings for their own use in flange production, and most of these producers manufacture only a limited range of forgings.

Gerlin is aware of the following foreign producers of forgings, in no particular order:

Producer	Country
Kofco	Korea
MGI	France
Maass	Germany, Mexico
Metalfar	Italy
Schultz	Malaysia
Ulma/Enara	Spain
Viraj	India
Bombay	India
Enlin	Philippines
Bebitz	Germany

Because flange forgings are an intermediate product made almost entirely for internal consumption, there is not, to Gerlin's knowledge, any public source of data about domestic production and consumption of forgings, nor is Gerlin able to provide an accurate estimate. Industry-wide data are not critical with respect to this exclusion request, however, because the issue is not whether the forgings are produced in the United States, nor whether the domestic capacity to produce forgings is sufficient to meet domestic demand. Flange forgings are produced in the United States, and there is probably domestic capacity to satisfy demand, in a purely arithmetic sense. The problem facing Gerlin is that there is no commercial market for flange forgings, and, as explained below, no commercial alternative to sourcing forgings from abroad. Accordingly, if flange forgings are subjected to import restrictions, Gerlin will be cut off from its only viable source of feedstock and will be driven out of business.[2/]

III. REASONS FOR EXCLUDING STAINLESS STEEL FLANGE FORGINGS FROM IMPORT RELIEF

Any import remedy imposed by the President should not restrict imports of stainless steel flange forgings. These imports are essential to the viability of Gerlin and of other non-integrated flange producers. There is no commercial U.S. market for flange forgings, which disables independent flange makers from obtaining adequate supplies of flange forgings domestically. The ITC staff found that forgings are one of a number of stainless steel products that purchasers

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[2/] The TPSC also requested projections of domestic consumption for the next several years. The same lack of data on past and present production and consumption of flange forgings makes estimates of future consumption speculative. In general, though, demand for stainless steel flanges, and accordingly for flange forgings, is a function of construction activity, particularly in the oil and gas, chemical, pharmaceutical, food processing, and similar industries. The general economic slowdown that has become evident this year is likely to continue into the near future and depress demand for flange forgings.

identified as "unavailable or in short supply in the U.S. market." Staff Report, at STAINLESS-100. Extending any remedy to include foreign forgings would seriously undermine the effectiveness of the remedy, by making it impossible for Gerlin and other independent flange manufacturers to survive, let alone adjust to import competition.

A. Non-Captive Domestic Production of Flange Forgings Does Not Exist

Independent stainless steel flange forging capacity in the United States is effectively non-existent. Although there are many independent companies that have some sort of forging capability, most of these do not venture into the specialized area of stainless steel forging. Those that do are too small to produce forgings at the volume, quality, and price to qualify as suppliers to major stainless steel flange makers such as Gerlin.

Gerlin recently conducted a comprehensive search for independent sources of stainless steel flange forgings. In July of this year it faxed an inquiry about the price and availability of every standard size and type of flange forging to some 100 companies that, by name and description in industry directories, might have some capacity to produce stainless steel flange forgings. A list of the firms contacted and a copy of Gerlin's solicitation are attached as Exhibit A.

Approximately 40 of the firms responded that they could not bid because they did not make stainless steel flange forgings. Most of the remaining 60 firms that were solicited did not even bother to respond. A handful of the firms responded that they would be willing to try to make stainless steel flange forgings if Gerlin would assume the high cost of providing the dies and fixtures to enable the firms to adapt their current equipment. This canvass confirmed Gerlin's conclusion, reached after years in the stainless steel flange business, that Gerlin cannot

turn to any independent stainless steel flange forging capacity in the United States as a source for the flange forgings that it needs.

B. Captive Domestic Production of Flange Forgings is Not Available to Independent Flange Manufacturers

In the absence of independent flange forging capacity, non-integrated flange producers such as Gerlin have only one other place to turn domestically: to integrated producers of flanges and flange forgings. To Gerlin's knowledge, there are only two domestic producers that manufacture a wide range of both stainless steel flanges and flange forgings: Ideal Forging Company and Maass Flange Corporation. A few other domestic producers make a more limited quantity of forgings, and a more limited range, focusing on forgings of either very large sizes (Western Forge and Flange, Newman Flange Co., Texas Metals, Inc.) or very small sizes (Flowline Division of Markovitz Enterprises, Inc., Westbrook Manufacturing). All of these are direct competitors with Gerlin in the finished stainless steel flange market. Understandably, these competitors of Gerlin are not interested in supplying to Gerlin flange forgings in a volume or at a price that would make Gerlin all the more competitive in the finished flange market.[3/] In order to obtain

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[3/] On occasion, Gerlin does purchase flange forgings from domestic sources, typically when a Gerlin customer makes a rush order that includes some flanges for which Gerlin does not have the necessary forgings in stock and cannot afford the time necessary to order them from abroad. In testimony before the ITC, Ideal Forging stated that it had sold Gerlin some 6000 flange forgings in 1998-99. That number represents about [ ] of the forgings that Gerlin needed during that time to make finished flanges. As Gerlin testified before the ITC, the domestic flange forgings that Gerlin buys under rush circumstances are not sold to Gerlin at a price that enables Gerlin to make flanges from the forgings and sell the flanges to the customer at a reasonable profit. Gerlin only makes these domestic purchases in order to satisfy the customer and retain the larger order that is profitable. If Gerlin had to depend on domestically supplied forgings for any substantial portion of its business, it would be out of business.

flange forgings from reliable sources that see Gerlin as a customer, not as a competitor, Gerlin must look offshore.[4/]

Thus, imports of stainless steel flange forgings are essential if the non-integrated U.S. producers of flanges are to remain in business. If restrictions were imposed on imports of flange forgings, the restrictions would destroy the domestic flange industry that they were intended to revive.

C. Excluding Flange Forgings from Relief Will Not Hurt the Domestic Industry

Leaving flange forging imports unrestricted would cause no damage to the domestic industry. Because the use of imported forgings is limited, and because many of the major flange producers are integrated to some degree, the volume of imported forgings is likely to remain low. Furthermore, because all of the domestic producers compete exclusively in the finished flange market, imported forgings would never confront them in the marketplace. The small volume of imported forgings needed by domestic flange producers is conducive to a more competitive domestic flange industry.

Excluding forgings from import relief preserves the freedom of both integrated and non-integrated flange producers to purchase forgings from whatever sources they choose. If the President imposed import relief on both flange forgings and finished flanges, it would make it impossible for non-integrated producers to stay in business. Alternatively, if the President failed

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4/ Gerlin is by no means the only U.S. flange producer that looks to foreign suppliers for flange forgings. As Gerlin testified before the ITC, even the large integrated producers, such as Ideal and Maass, both of which oppose the exclusion of flange forgings from any remedy applied to finished flanges, from time to time fill gaps in their capacity by sourcing from abroad. Apparently, the competitive benefit to these producers of ensuring that Gerlin has no foreign source for its forgings outweighs any current need they themselves may have for imports.

to impose import relief on finished flanges, it would doom both non-integrated and integrated domestic producers to continued deterioration. Only by restricting imports of finished flanges while permitting flange forgings to continue to be imported would the President promote positive adjustment to import competition in the market for finished flanges.

D. Excluding Flange Forgings Promotes the Purpose of Section 201

Excluding flange forgings from import relief is the only way to carry out the mandate of Section 201. Section 201 is intended to facilitate the efforts of the domestic industry to make a positive adjustment to import competition. Non-integrated producers in the domestic industry, such as Gerlin, would go out of business if their supplies of forgings were restricted. Such a restriction would thus not facilitate industry adjustment to import competition.

Moreover, imported forgings do not compete with domestic forgings, because domestic forgings are dedicated almost exclusively to captive use, not for sale on the commercial market. Thus, there is no reason to restrict forging imports to facilitate adjustment to competition from foreign forgings — for all practical purposes, foreign forgings do not compete with domestic forgings in the market.

Members of the ITC have recognized that "products that are either not available from domestic suppliers or are not available in commercially significant volumes" should be excluded. *Certain Steel Wire Rod*, TA-201-69, USITC Pub. 3207, at I-56 (July 1999) (separate views of Chairman Miller and Commissioner Koplan). Such an exclusion serves the statutory purpose of enabling the domestic industry to adjust to import competition. Imposing import restrictions on commercially unavailable products only causes further injury.

E. Imports of Flange Forgings are Not Causing Injury to the Domestic Industry

Significantly, official import statistics demonstrate that imports of stainless steel flange forgings are not increasing. Imports of forgings rose from 4.1 million kilograms in 1996 to 4.3 million in 1997 and 4.8 million in 1998, but then fell to 3.3 million in 1999 and recovered only to 4.0 million in 2000, below the level for each year of 1996, 1997, and 1998. From 1996 to 2000, then, imports actually fell, and the decline continues in 2001: from the first half of 2000 to the first half of 2001, the volume of imports declined over 77 percent. This import trend is incompatible with any finding that foreign flange forgings have been a substantial cause of serious injury. Notably, the ITC's injury determination was based on product category 33 in its entirety, which encompassed not only flange forgings but also six other tariff classifications. Had it considered injury on an HTS-specific basis, the ITC would have found no basis to determine injury from imported flange forgings. The President is not constrained by the product categories used by the ITC, and he should ensure that flange forgings are not swept into a remedy determination despite the lack of evidence that they have caused any injury.

F. Other Flange Forgings Were Excluded from the Investigation

Excluding stainless steel flange forgings would cure the anomaly that *carbon* steel flange forgings (HTSUS 7307.91.1000) are already excluded from the investigation because they were not included among the products listed in the U.S. Trade Representative's request to the ITC. As Gerlin noted in sworn testimony before the ITC, it makes no commercial sense for stainless steel flange forgings to be subject to import relief while carbon steel flange forgings are not, since the two types of forgings play precisely the same role in their respective markets. Presumably, imported carbon steel flange forgings were omitted because they are crucial to U.S. producers of

finished carbon steel flanges. The same rationale should exclude stainless steel flange forgings from any import relief.

CONCLUSION

Imported stainless steel flange forgings play a limited but critical role in the U.S. market. In the absence of independent U.S. forging producers, non-integrated flange manufacturers like Gerlin cannot obtain flange forgings at competitive prices from the integrated manufacturers with which they directly compete in the finished flange market. Sourcing from abroad is the only option. To promote positive adjustment to import competition by the domestic flange industry, therefore, the President should impose import relief on finished flanges, but not on flange forgings. Leaving flange forgings unrestricted would serve the purpose of Section 201 by enabling domestic flange producers, integrated and non-integrated alike, to continue to purchase forgings from whatever sources make them most competitive in the finished flange market. Conversely, restricting imports of flange forgings would crush Gerlin and other independent flange makers between the high forging prices offered by integrated competitors and the low finished flange prices offered by foreign flange suppliers to the U.S. market.

Respectfully submitted,

/s/ Simeon M. Kriesberg

Simeon M. Kriesberg
Carol J. Bilzi
Lisa L. Levine
MAYER, BROWN & PLATT
1909 K Street, N.W.
Washington, D.C. 20006-1101

Counsel for Gerlin, Inc.

November 13, 2001

EXHIBIT A

Firms Solicited by Gerlin
for Price and Availability of
Stainless Steel Flange Forgings

Ajax Forge Co.
Aluminum Precision Products, Inc.
American Axle & Mfg. Inc.
Anchor-Harvey Components, LLC
Arro Forge, Inc.
Bonney Forge Corp.
Brockhaus Inc.
Canada Forgings Inc.
Canton Drop Forge, Inc.
Carbo Forge & Machining, Inc.
Chamberlain Mfg. Corp.
Clapp Corp.
Cleveland Hardware & Forging Co.
Clifford-Jacobs Forging Co.
Commercial Forged Products
Consolidated Industries, Inc.
Cooper Industries
Crosby Group, Inc.
Dana Corporation
DeKalb Forge Company
Delfasco Forge Div.
Deutsch Metal Components
Dixie Industries
Drop Dies & Forgings Co.
Eaton Corp.
Ellwood Texas Forge
Federal Forge Inc.
Ford Motor Co. Vulcan Forge Plant
Forgings & Stampings, Inc.
Fox Valley Forge Div.
Green Bay Drop Forge Div.
Harris Thomas Industries, Inc.
Hussey Marine Alloys Ltd.
Illinois Forge, Inc.
Impact Forge, Inc.
IMT-P.C. Drop Forge Div.
Independent Forge Co.
International Crankshaft Inc.
Interstate Forging Industries, Inc.

Jernberg Industries, Inc.
K.D.K. Upset Forging Co., Inc.
Kaiser Aluminum-Oxnard
Ken-Tool, Custom Forging Div.
Kentucky Forge, Inc.
Keystone Forging Co.
King-Indiana Forge, Inc.
Kishwaukee Forge, Inc.
Kropp Forge
Krupp Gerlach Co. Veedersburg Plant
Krupp Gerlach Co. Forge Div.
Lakeview Forge Co.
Lefere Forge & Machine
Louisville Forge & Gear Works, LLC
Louisville Forge Inc.
MacLean Forge
Mascotech Forming Technologies
Meadville Forging Co.
Melling Forging Co.
Mercer Forge Corp.
Metform
Midland Forge Div.
Mid-West Forge Corp.
Milwaukee Forge
Missouri Forge, Inc.
Modern Forge/Tennessee
Modern Drop Forge Co.
Moline Forge, Inc.
National Forge Company
Norforge & Machining Inc.
Nucor Bearing Products
Ogemaw Forge Company
Pacific Forge, Inc.
Peddinghaus Modern Technologies LLC
Portland Forge
Presrite Corp.
Primex Technologies, Inc.
Queen City Forging Co.
Rex Forge Div.
Rhode Island Tool Co.
Rockford Drop Forge
Schaefer Equipment, Inc.
Sermatech Aeroforge Corp.

St. Orms Forge
T&W Forge Co.
Trenton Forging Co.
Trinity Forge, Inc.
Tube Turns Technology, Inc.
Turbine Engine Components Textron
Ulven Forging Co.
Unit Drop Forge Co.
United Defense L.P., Steel Products Division
United States Forgecraft Corp.
Utica Corp.
Vulcan Co.
W. Pat Crow Forgings
Waltec Forgings, Inc.
Webb Forging Co.
Weber Metals, Inc.
Wright Source
Wyman-Gordon Forgings

Gerlin, Inc.

170 Tubeway Drive
Carol Stream, Illinois 60188
(630) 690-7000
Fax (630) 690-9701

FAX FROM GERLIN.....

DATE: JULY 20, 2001

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TO: INDEPENDENT FORGE CO

ATTN.: SALES DEPARTMENT

COPY TO:
Phone

FAX 714-997-7546

FROM: DEAN SHARKEY
GERLIN INC.
P.O. BOX 5945
CAROL STREAM, IL. USA
60197-5945

Phone 630-690-7000
Fax Phone 630-690-7109

CC:

REMARKS: ☐ Urgent ☒ For your review ☒ Reply ASAP ☐ Please Comment

SUBJECT: FORGING INQUIRY

PLEASE QUOTE PRICE AND AVAILABILITY ON THE ATTACHED LIST OF STAINLESS STEEL FORGINGS PRODUCED IN ACCORDANCE WITH ASTM A182. ATTACHED IS THE FINISHED DIMENSION OF THESE FLANGES. LAP JOINT FORGINGS ARE FOR FULL DIMENSIONAL LAP JOINTS.

IF YOU HAVE ANY QUESTIONS, PLEASE DO NOT HESITATE TO CALL.

BEST REGARDS,

DEAN SHARKEY
VP PURCHASING

DEAN,
SORRY! NO BID.
WE ONLY MANUFACTURE
CLOSED-DIE ALUMINUM
FORGINGS.

THANK YOU!

JUL 23 2001

SIZE	ITEM DESCRIPTION	GRADE	
3/4	150 RF WN 80S	304/L	350
1 1/2	150 RF WN 80S	304/L	350
2	150 RF WN 80S	304/L	3000
2 1/2	150 RF WN 80S	304/L	280
3	150 RF WN 80S	304/L	2000
4	150 RF WN 80S	304/L	2100
6	150 RF WN 80S	304/L	1450
8	150 RF WN 80S	304/L	250
10	150 RF WN 80S	304/L	230
2	150 RF LAP JOINT	304/L	6000
2 1/2	150 RF LAP JOINT	304/L	800
3	150 RF LAP JOINT	304/L	5000
4	150 RF LAP JOINT	304/L	4500
5	150 RF LAP JOINT	304/L	800
6	150 RF LAP JOINT	304/L	1050
8	150 RF LAP JOINT	304/L	1100
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12	150 RF LAP JOINT	304/L	200
1/2	150 RF LAP JOINT	304/L	3000
3/4	150 RF LAP JOINT	304/L	3400
1	150 RF LAP JOINT	304/L	9000
2	150 HH BLD	304/L	1800
6	150 BLD	304/L	800
8	150 BLD	304/L	100
10	150 BLD	304/L	75
12	150 BLD	304/L	50
2	150 RF SW	304/L	4000
2 1/2	150 RF SW	304/L	280
3	150 RF SW	304/L	700
4	150 RF SW	304/L	450
1	300 RF WN 80S	304/L	150
1 1/2	300 RF WN 80S	304/L	375
2	300 RF WN 80S	304/L	450
3	300 RF WN 80S	304/L	250
4	300 RF WN 80S	304/L	400
6	300 RF WN 80S	304/L	185
8	300 RF WN 80S	304/L	185
10	300 RF WN 80S	304/L	45
12	300 RF WN 80S	304/L	20
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1	300 RF LAP JOINT	304/L	1400
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2	300 RF SW	304/L	200
1/2	150 RF WN 80S	316/L	500
1	150 RF WN 80S	316/L	3000
1 1/2	150 RF WN 80S	316/L	400
2	150 RF WN 80S	316/L	3000
3	150 RF WN 80S	316/L	2500
4	150 RF WN 80S	316/L	1450
6	150 RF WN 80S	316/L	800
8	150 RF WN 80S	316/L	100
1/2	150 RF LAP JOINT	316/L	7500
3/4	150 RF LAP JOINT	316/L	3500
1	150 RF LAP JOINT	316/L	20000
1 1/2	150 RF LAP JOINT	316/L	8000
2	150 RF LAP JOINT	316/L	11000
2 1/2	150 RF LAP JOINT	316/L	225
3	150 RF LAP JOINT	316/L	8000
4	150 RF LAP JOINT	316/L	4500
5	150 RF LAP JOINT	316/L	75
6	150 RF LAP JOINT	316/L	2800
8	150 RF LAP JOINT	316/L	200
10	150 RF LAP JOINT	316/L	150
12	150 RF LAP JOINT	316/L	230
2	150 HH BLD	316/L	4300
3	150 BLD	316/L	2700
4	150 BLD	316/L	1900
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3/4	300 RF WN 80S	316/L	200
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2	300 RF WN 80S	316/L	100
3	300 RF WN 80S	316/L	200
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6	300 RF WN 80S	316/L	50
8	300 RF WN 80S	316/L	40

SIZE	ITEM DESCRIPTION	GRADE	
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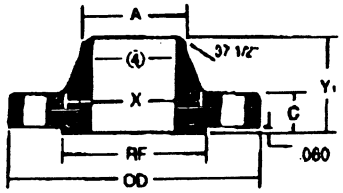
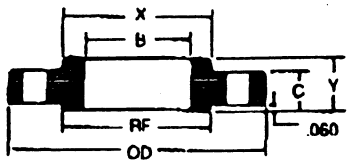
1	300 RF LAP JOINT	316/L	1600
1 1/2	300 RF LAP JOINT	316/L	600
2	300 RF LAP JOINT	316/L	250
3	300 RF LAP JOINT	316/L	150
8	300 RF LAP JOINT	316/L	25
2	300 HH BLD	316/L	300
3	300 BLD	316/L	175
4	300 BLD	316/L	50
6	300 BLD	316/L	40
2	300 RF SW	316/L	100
2 1/2	300 RF SW	316/L	10
3	300 RF SW	316/L	25

Flanges



WELD NECK



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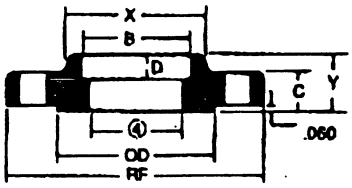
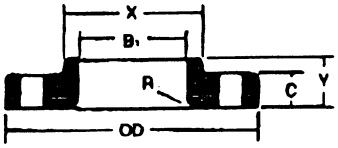
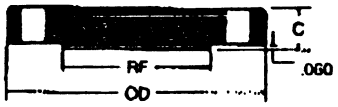


SOCKET WELD



LAP JOINT



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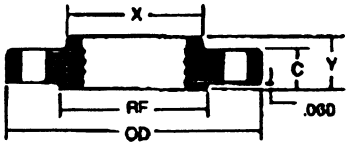

THREADED

NOM PIPE SIZE	CLASS 150③												
	OD	C	X	A	Y	Y_1	B	B_1	R	D	RF	BOLT CIRCLE DIA	BOLT HOLE QTY/DIA
½	3.50	0.44	1.19	0.84	0.62	1.88	0.88	0.90	0.12	0.38	1.38	2.38	4/0.62
¾	3.88	0.50	1.50	1.05	0.62	2.06	1.09	1.11	0.12	0.44	1.69	2.75	4/0.62
1	4.25	0.56	1.94	1.32	0.69	2.19	1.36	1.38	0.12	0.50[⑤]	2.00	3.12	4/0.62
1¼	4.62	0.62	2.31	1.66	0.81	2.25	1.70	1.72	0.19	0.56	2.50	3.50	4/0.62
1½	5.00	0.69	2.56	1.90	0.88	2.44	1.95	1.97	0.25	0.62	2.88	3.88	4/0.62
2	6.00	0.75	3.06	2.38	1.00	2.50	2.44	2.46	0.31	0.69	3.62	4.75	4/0.75
2½	7.00	0.88	3.56	2.88	1.12	2.75	2.94	2.97	0.31	0.75	4.12	5.50	4/0.75
3	7.50	0.94	4.25	3.50	1.19	2.75	3.57	3.60	0.38	0.81	5.00	6.00	4/0.75
4	9.00	0.94	5.31	4.50	1.31	3.00	4.57	4.60	0.44	0.94[⑤]	6.19	7.50	8/0.75
5	10.00	0.94	6.44	5.56	1.44	3.50	5.66	5.69	0.44	0.94[⑤]	7.31	8.50	8/0.88
6	11.00	1.00	7.56	6.63	1.56	3.50	6.72	6.75	0.50	1.06[⑤]	8.50	9.50	8/0.88
8	13.50	1.12	9.69	8.63	1.75	4.00	8.72	8.75	0.50	1.25[⑤]	10.62	11.75	8/0.88
10	16.00	1.19	12.00	10.75	1.94	4.00	10.88	10.92	0.50	1.31[⑤]	12.75	14.25	12/1.00
12	19.00	1.25	14.38	12.75	2.19	4.50	12.88	12.92	0.50	1.56[⑤]	15.00	17.00	12/1.00

ALL DIMENSIONS ARE IN INCHES
③ IN ACCORDANCE WITH ASME/ANSI B16.5
④ NOT APPLICABLE TO LAP JOINTS
LAP JOINT LENGTH = 14 - 3.12
16 - 3.44
18 - 3.81
20 - 4.06
24 - 4.38
⑤ INDUSTRY PRACTICE
⑦ BORE OF WN & SW TO BE SPECIFIED, SEE PAGES 10 AND 11